

**THE IMPACT OF LIFE EVENTS ON
DEPRESSION AMONG ELDERLY IN KELANTAN**

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ABSTRAK (BAHASA MALAYSIA)

IMPAK PERISTIWA HIDUP KE ATAS KEMURUNGAN DALAM KALANGAN WARGA EMAS DI KELANTAN

Latar belakang: Peristiwa hidup telah dikaitkan dengan tercetusnya gejala kemurungan. Seiring dengan peningkatan usia, warga emas yang telah menempuh banyak peristiwa dalam kehidupan mereka akan lebih terdedah kepada kemurungan. Tujuan kajian ini dijalankan adalah untuk mengumpul data tentang kelaziman kemurungan dalam kalangan warga emas di Kelantan dan mengenalpasti hubung kait antara peristiwa hidup dan kemurungan dalam kalangan warga emas.

Metodologi: Kajian ini merupakan kajian keratan rentas yang dijalankan di Kelantan bermula dari April 2016 hingga Disember 2017. Sampel kajian telah diambil melalui kaedah persampelan kelompok yang dilakukan secara rawak ke atas 422 warga emas di Kelantan yang berusia 60 tahun dan ke atas. Skala Kemurungan Geriatrik versi Bahasa Melayu (Geriatric Depression Scale-15 [M-GDS-15]) telah digunakan untuk mengesan kemurungan dalam kalangan warga emas manakala Skala Pengubahsuaian Sosial (SRRS) digunakan untuk mengetahui peristiwa hidup yang dihadapi dalam tempoh dua belas bulan sebelum kajian ini dijalankan. Data telah dianalisa melalui ujian regresi logistik ringkas dan berganda.

Keputusan: Peratusan kelaziman kemurungan di kalangan warga emas di Kelantan ialah 22%. Usia melebihi 75 tahun dan tinggal di rumah tradisional didapati berkait rapat dengan kemurungan, manakala perkahwinan dan senaman dikenalpasti sebagai faktor penghalang kepada kemurungan. Peristiwa hidup yang didapati signifikan

sebagai pencetus kepada kemurungan di kalangan warga emas adalah kematian pasangan (95% CI :1.45, 26.34, $p=0.014$), perubahan aktiviti sosial (95% CI : 2.24,6.91, $p<0.001$), penyakit atau kecederaan serius (95% CI :1.15,7.84, $p=0.025$), perubahan tabiat hidup (95% CI :1.50,4.73, $p=0.001$), perubahan tabiat tidur (95% CI : 1.38,4.70, $p=0.003$), perubahan cara hidup (95% CI :1.32,4.61, $p=0.005$), dan perubahan bilangan perjumpaan dengan ahli keluarga (95% CI : 1.32,4.07, $p=0.004$).

Kesimpulan:-Peratusan kelaziman kemurungan di kalangan warga emas di Kelantan adalah tinggi. Perubahan dalam hubungan sosial, aktiviti dan gaya hidup berhubung kait secara signifikan dengan kemurungan dalam kalangan warga emas. Peristiwa-peristiwa dalam kehidupan ini tidak dapat dielakkan, justeru, terdapat keperluan untuk mengenal pasti gejala-gejala awal kemurungan, terutamanya dalam kalangan warga emas yang menempuh beberapa peristiwa hidup dalam masa yang terdekat. Intervensi sosial seperti promosi gaya hidup yang sihat dan aktif di kalangan warga emas perlu diberi perhatian.

Kata kunci: peristiwa hidup, kemurungan, warga emas

ABSTRACT

THE IMPACT OF LIFE EVENTS ON DEPRESSION AMONG ELDERLY IN KELANTAN

Background: Life events are believed to be associated with the development of depression. The extended years of living will invariably subject the elderly people to more life events. Thus, they are more vulnerable to suffer from depression. The aim of this study is to determine the prevalence of depression among the elderly residents in Kelantan and to elucidate the association between life events and the elderly depression.

Methods: This is a cross sectional study, which was conducted in Kelantan from April 2016 until December 2017. Stratified random sampling method was used to recruit 422 elderly people aged 60 years and above. The Malay Geriatric Depression Scale-15 (M-GDS-15) was utilized to identify the presence of depression, while life events occurring in the past twelve months were evaluated using the Social Readjustment Rating Scale (SRRS). Data were analyzed using simple and multiple logistic regressions.

Results: The prevalence of depression among elderly in Kelantan is 22%. Being older elders (aged more than 75) and staying in traditional house were found to have positive association with depression, while being married and performing exercise were identified as the protective factors against depression. The significant life events that contributed to elderly depression were death of spouse (95% CI =1.45, 26.34, $p=0.014$), changes of social activities (95%CI: 2.24,6.91, $p<0.001$), serious illness or

injuries (95% CI =1.15,7.84, $p=0.025$), changes of life habits (95%CI: 1.50,4.73, $p=0.001$), changes of sleeping habits (95% CI: 1.38,4.70, $p=0.003$), changes of lifestyle (95%CI: 1.32,4.61, $p=0.005$) and changes of numbers of family get-together (95% CI: 1.32,4.07, $p=0.004$).

Conclusion: The prevalence of depression among elderly in Kelantan is high. The changes in social relationship, activities and lifestyles are significantly related with elderly depression. These life events are inevitable in elderly. Therefore, there is a need to detect early signs of depression especially in those who faced certain amounts of recent life events. Social interventions such as promoting healthy and active lifestyle among elderly also warrant attention.

Keywords: life events, depression, elderly

CHAPTER 1

INTRODUCTION

The global ageing population has been increasing dramatically in recent years, due to decline in fertility and morbidity. A higher life expectancy rate has led the elderly to live longer than in the past. Thus, there is an increased likelihood for them to suffer from mental health problems that commonly afflict older adults such as dementia, depression and paranoia (Lam, et al., 2009; Lemke & Schaefer, 2010).

The Malaysian Department of Statistics in its Population Projection Report (Revised) 2010-2040 published in 2016 estimated that approximately 1.4 million people in year 2010 were aged 60 years and above, representing almost 5% of the total population of 28.6 million. By 2040, projections indicate that the percentage of old age increases significantly, when the percentage of the population aged 65 years and above reaches 14.5%. This upward growth trajectory predicts the increased cost and demand for health care services to cater for elderly needs.

Since the physical and neuropsychiatric illness is inevitable in elderly, the risk for them to develop depression is higher. The prevalence of depression among elderly ranges from 7 to 16% worldwide (Buys,et al., 2008; Pan, et al., 2008; Steffens & Potter, 2008). In Malaysia, the prevalence of depression among the elderly varies, depending on the type of assessment scale that was used and the place where the study was conducted (Imran, et al., 2009; A Rashid, Manan, & Rohana, 2010;

Sherina, Rampal, Hanim, & Thong, 2006; Teh & Hasanah, 2004) and can be as high as 67% (Al-Jawad, Rashid, & Narayan, 2007).

Social factors were recognized as one of the causative factors for elderly depression. These factors include age, gender, marital status, educational background, socio economic status and daily life hassles (Shittu RO., et al., 2014). Life events have been associated with depression in which the significant changes in a person's normal life routines were perceived stressful and could predispose to the development of depression, irrespective of whether these events are desirable or undesirable. While psychiatrist Thomas Holmes and Richard Rahe (1967) found the link between life stressors and physical illness, other available evidences suggest that it could also affect the mental health. As reported by Hatch and Dohrenwend (2007), undesirable or negative events are more strongly associated with poor outcomes (such as depression) than are desirable, positive events.

Nevertheless, to date, there is very limited data on life events among elderly in Malaysia and their impacts on depression. Early recognition of depression in elderly may improve the prognosis of the illness with subsequent improvement in overall functioning and quality of life. Thus, this research was conducted to look into this matter in the context of local population, specifically in the elderly population in Kelantan.

This dissertation was arranged according to the new manuscript ready format as been aligned by the faculty and represented the whole body of dissertation with the title of "The Impact Of Life Events On Depression Among Elderly In Kelantan".

Operational Definition

- 1) Elderly – those who aged 60 years and above
- 2) Older elderly – elderly aged more than 75 years old
- 3) Traditional house – Wooden house, consisted of basic living unit with a few stairs in front of it and equipped with basic amenities i.e electricity and water supply.
- 4) Exercise - Activities requiring physical effort, carried out to sustain or improve health and fitness i.e jogging, brisk walk.
- 5) ‘Undang-undang kecil’ (from Social Readjustment Rating Scale) – minor offences i.e being fined for traffic offences

CHAPTER 2

LITERATURE REVIEW

Life events

Wagner et al. (1988) reported that stressful life events, either negative or positive, are changes that occur suddenly in one's life and have the capacity to adversely affect one's mental health. Stressful life events are classified according to the degree of their impact onto an individual's life.

Holmes and Rahe (1967) identified 43 recent life events which can lead to significant psychosocial stress and trigger the development of depression as well as other physical illnesses. These include, amongst others, the lost of spouse, divorce, personal injury, loss of employment, marriage, reconciliation of marriage, become pregnant and change in financial state. However, the development of depression can also be influenced by genetic factors. Those who are predisposed to major depression have a higher risk to develop this debilitating illness following exposure to stressful life events.

Individuals from various age groups are exposed to different sets of life events throughout their lives. The events that cause an illness in a person may not necessarily cause the same illness to another person. An old but very useful research by Cooper in 1988 has shown that individual differences in the appraisal of life events influence the amount of stress associated with those events and their impact on health. Yet, despite the potentially important age-related differences, there is a lack of

studies focusing on stressful events in late life. Many studies have shown that recent life events contribute to the onset of psychiatric illnesses. In fact, they have been found to have a substantial causal relationship with depressive symptoms. The more stressful the events were, the more severe the symptoms manifested. This represents a dose-response relationship. As such, the quality of stressful life events is a significant predictor of depressive symptoms (Sokratis, 2013).

Furthermore, the association between stressful life events and psychiatric illnesses is stronger than the association with physical or medical illnesses. Vincent and Roscenstock (1979) in their study have found that, prior to hospitalization, patients with psychiatric disorders had suffered more stressful events than those with physical disorders. This is further supported by findings from a local study conducted by Asrenee AR (2007) which compared the nature, severity and frequency of stressful life events preceding hospitalization in warded psychiatric and medical patients. The impact of stress onto these two groups of patients were then investigated using the Interview for Recent Life Event (IRLE) assessment tool. The preceding life event and the objective negative impact were assessed among 256 patients with Interview for Recent Life Event (IRLE) and found that, at least one preceding life event was reported in 206 patients.

Depression in the elderly population is a national health burden with tremendous impact on their quality of life (QOL). The impact of stressful life events is mediated by the elderly's personal beliefs, psychological stability, educational level and socio-economic background. Depressed elderly patients were reported to have

experienced significant higher number of stressful life events, with a predominance seen in females, low 'per capita income' groups and those who perceived crisis in the family (Agarwal N., Jhingan HP, 2002). In fact, special attention should be given to elderly people who have experienced an accumulation of stressful events and daily hassles, because they seem to be a group at greater risk (V. Kraaij, et al., 2002).

Depression in Elderly

There are many literatures available that explore the prevalence of depression among the elderly across cultures and continents. Its dynamic relationship with various socio-demographic variables has been described vastly.

Generally, a wide range of prevalence has been demonstrated between nations. In Netherlands, the prevalence of major depression among the elderly in a community-based study was found to be at 2.02% with higher prevalence for minor depression (Beekman, et al., 1995). A review paper for depression in general elderly population also found a similar prevalence with a range between 1%- 4% (Alexopoulos, 2005).

The prevalence of elderly depression in Asian countries was found to be higher in comparison to the west population. A large-scale study by Wada, et al. in 2005 using GDS-15 involving three densely-populated Asian countries reported a prevalence of 33.8%, 17.2% and 30.3% in Indonesia, Vietnam and Japan respectively.

Various socio-demographic factors have been identified to be significantly correlated with depression. A meta-analysis for qualitative studies identified six risk factors for the development of depression among the community dwelling elderly. These risk factors were poor health status, poor self-perceived health, having had new medical illness, history of depression in the past, disability and bereavement. The latter three were similarly identified from a quantitative meta-analytic study. Another two risk factors that were recognized were sleep disturbance and being female elderly (Cole MG, Dendukuri N, 2003). Concomitant physical illness and bereavement not only precipitate the development of depression but also weaken the prognosis (Denihan, Kirby, et al., 2000). A systematic review examining the prognosis of depression in elderly community and primary care populations found four factors that were associated with poor prognosis, consisting of physical illness, disability, cognitive impairment and depression of severe type (Cole MG, et al., 1999).

Depression among the elderly can also be viewed from the psychosocial model. The psychosocial model hypothesized that loss of self-esteem, loss of meaningful roles, loss of significant others and diminished social contacts have a significant causal relationship with depression especially among the elderly living in community (Reker GT., 1997).

A local study has been conducted to determine the prevalence of major depression among the elderly hospitalized for physical illness in Hospital University Sains Malaysia (HUSM). More than one third of 271 elderly inpatients were found to have major depression (37.3%) with higher prevalence in women (45.8%) than in male (25.9%) (Teh EE, Hasanah CI, 2004). Lower prevalence of depression was

found in a community study involving the elderly in rural Federal Land Development Authority (FELDA) whereby 23.5% had mild depression of and 2.5% had severe depression (Ibrahim, Din et al. 2013). This study also described having good physical functioning to be inversely correlated with depression.

Another local study looking at the socio-demographic factors that may affect the psychological well-being in elderly described four variables that predict poor outcome which include being oldest-old, elderly women, unmarried and being poor. These findings were different from the meta-analysis described by Cole and Dendukuri (2003). The differences can be explained by the different population demographics, wherein the Malaysian population is still more traditional and family orientated while being in a transition to become a high-income population. The psychological well being may have a direct relationship with depression thus similar socio-demographic factors may also predict the prevalence of depression in this elderly population (Momtaz, Ibrahim et al. 2011). In a separate study, Momtaz et al. (2010) found a significant relationship between chronic morbidity and psychological well-being among the elderly in Northern Peninsular Malaysia. Multiple comorbidities predicted low psychological wellbeing. Other risk predictors include female gender, unmarried and unemployed elderly. Unemployment was also demonstrated to be significantly associated with depression in elderly in another local community study (Sidik, Rampal, et al., 2004).

CHAPTER 3

OBJECTIVES

General Objective

The aim of this study is to establish an understanding on the impact of life events on depression among elderly in Kelantan, Malaysia.

Specific Objectives

1. To determine the prevalence of depression among the elderly in Kelantan.
2. To determine association between socio demographic factors and depression in elderly in Kelantan.
3. To identify the association between life events and depression among the elderly in Kelantan.

CHAPTER 4

MANUSCRIPT

TITLE: THE IMPACT OF LIFE EVENTS ON DEPRESSION AMONG ELDERLY IN KELANTAN

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ABSTRACT

Background: Life events are believed to be associated with the development of depression. The extended years of living will invariably subject the elderly people to more life events. Thus, they are more vulnerable to suffer from depression. The aim of this study is to determine the prevalence of depression among elderly in Kelantan and to elucidate the association between life events and the elderly depression.

Methods: This is a cross sectional study, which was conducted in Kelantan from April 2016 till December 2017. Stratified random sampling method was used to recruit 422 elderly people aged 60 years and above. The Malay Geriatric Depression Scale-15 (M-GDS-15) was utilized to identify the presence of depression, while life events occurring in the past twelve months were evaluated using the Social Readjustment Rating Scale (SRRS). Data were analyzed using simple and multiple logistic regressions.

Results: The prevalence of depression among elderly residents in Kelantan is 22%. Being older elders (aged >75) and staying in traditional house were found to have positive association with depression, while being married and performing exercise were identified as the protective factors against depression. The significant life events that contributed to elderly depression were death of spouse, changes of social activities, serious illness or injuries, changes of life habits, changes of sleeping habits, changes of lifestyle and changes of numbers of family get-together.

Conclusion: The prevalence of depression among elderly in Kelantan is high. The changes in social relationship, activities and lifestyles are significantly related with elderly depression. These life events are inevitable in elderly. Therefore, there is a need to detect early signs of depression especially in those who faced certain amounts of recent life events. Social interventions such as promoting healthy and active lifestyle among elderly also warrant attention.

Keywords: life events, depression, elderly

INTRODUCTION

Depression is now regarded as among the most leading causes of world's morbidity and mortality. There is a growing concern on this issue, especially when it comes to vulnerable population such as elderly and youth (Hidaka BH., 2012). However, detecting depression among elderly population is a highly challenging task. Depression among elderly population could be masked by the somatic complaints, which were actually a form of depressive symptom. Some also presented with complaints of insomnia, which was often overlooked as a hint of depression (Fiske et al, 2009). Under detection of depression among elderly inevitably leads to poor prognosis as treatment was delayed and the prolonged sufferings silently kill their souls, leading to poor quality of life.

Multifactorial causes of depression need to be tackled and managed holistically in order to treat depression to its core. Among the identified causes of depression were genetic loading, as well as multiple and prolonged life stressors. Many studies have demonstrated that accumulating a high number of life events within a brief period of time (one or two years) is associated to a wide range of physical illnesses (even accidents and athletic injuries), as well as mental health problems (Monat & Lazarus, 1991; Scully, Tosi, & Banning, 2000).

Hence, this study was conducted with great interest to determine the prevalence of depression among elderly in Kelantan, and to identify the association between life events and the elderly depression. The knowledge regarding the association between life events and depression among elderly is essential in order to understand the condition, which is important for early detection and proper treatment for those affected.

METHODS

Study design and Procedures

This is a cross-sectional population based study conducted in Kelantan from April 2016 till December 2017 with a total of 422 respondents. Stratified random sampling method was used in this study based on the Department of Statistic Malaysia (2010 & 2014) population census report. The state of Kelantan has a total of ten districts, however, for the purpose of this study, those districts have been merged into six

sectors namely Kota Bharu, Bachok – Pasir Puteh, Machang – Kuala Krai, Pasir Mas – Tumpat, Tanah Merah – Jeli and Gua Musang. For each sector, the Head of Mukim (Penggawa) was approached to obtain the list of elderly in each Mukim for block sampling later. Randomized stratified block sampling (stratified for gender and ethnicity) was done based on the list by picking up the alternate odd number. If the chosen elderly was unavailable or has passed away, the next odd number in the list would be chosen. Selection of respondents was continued until the required gender-ethnicity proportion was achieved. The inclusion criteria were elderly, aged 60 and above, residing in Kelantan, and able to understand either Malay or English, and those with severe cognitive impairment assessed by Elderly Cognitive Assessment Questionnaire (ECAQ) with score less than five was excluded from this study.

Ethical Approval

This study was approved by the Human Research Ethics Committee of University of Science Malaysia (JEPeM Reference No.: USM/JEPeM/15110493).

Measures

Socio-demographic proforma

Data on age, gender, ethnicity, religion, marital status, education level, occupation, monthly family income, source of income, and residency were collected. Additional information on independency, habits that could influence health status

such as smoking, alcohol consumption and exercise, history of chronic illness or mental illness, as well as knowledge about health facilities available for the elderly were also assessed.

The Malay Version of Geriatric Depression Scale- 15 items (M-GDS-15)

The Geriatric Depression Scale (GDS) – 15 items is a shortened form of the Geriatric Depression Scale-Long Form (GDS-L), which was widely used to measure depression in older adults. This 15-item version was developed as the original version of GDS, which comprises of 30 items was found to be time-consuming and difficult for some patients to complete. The 15 items comprised in this shortened version were chosen from the original version because of their high correlation with depressive symptoms in previous validation studies (Sheikh & Yesavage, 1986).

In a study conducted to test the criterion-based validity and reliability among the community-living Asian population, it was found that GDS-15 has a good sensitivity (97%) and specificity (95%). The instrument also has a good internal consistency with overall Cronbach's alpha of 0.80. The test-retest reliability over two weeks was 0.83 and inter-rater reliability was 0.94 (intra-class) and 0.99 (Cohen's kappa).

The questionnaire has also been translated and validated across other cultures such as the Arabic and Iranian population, China and Korean population with good internal consistency.

The Malay version of the GDS-15 was used in our study. Validation of the Malaysian GDS-15 has been conducted among 60 elderly in patients who had been classified as having major depression, minor depression and non- depression (Teh and Hasanah 2004). The resultant GDS-15 showed high internal consistency (Cronbach's $\alpha = 0.84$) and high test–retest reliability ($r = 0.84$).

Elderly Cognitive Assessment Questionnaire (Kua & Ko, 1992)

The Elderly Cognitive Assessment Questionnaire (ECAQ) is a 10-items questionnaire, which derived from items in the Mini-Mental State Examination and Geriatric Mental State Schedule. It was designed for quantitative assessment of cognitive impairment among elderly people living in developing countries, with a good sensitivity (85.3%), specificity (91.5%), positive predictive value (82.8%) and low overall miscalculation rate (10.5%). When compared with Kahn's Mental Status Questionnaire in a sample of 105 elderly respondents from two day-centers and a psychiatric outpatient clinic in Singapore, the ECAQ was found to have almost similar sensitivity of with the scales but has higher specificity and positive predictive value, and lower overall miscalculation rate.

Social Readjustment Rating Scale (Holmes and Rahe, 1967)

The Social Readjustment Rating Scale (SRRS) is an inventory of the most common life stressors, which consist of 43 life events that require varying degrees of personal readjustment. This 43-items questionnaire is also commonly known as ‘Holmes and Rahe Stress Scale’, after the author’s name. Gerst et al. (1978) tested the reliability of the SRRS, and found that rank ordering remained extremely consistent

for both healthy adults ($r = 0.96 - 0.89$) and patients ($r = 0.91$ to 0.70). With regard to its validity, Holmes and Rahe (1967) found a positive correlation ($+0.118$) between Life Change scores and illness scores.

This study used modified Malay version of SRRS with permission from the author. This Malay version that was used was initially translated by Othman (1986) and modified by Chan et al in 2014, including the addition of 20 questions that Othman had excluded from the original SRRS. The original English SRRS demonstrated good concordance (Spearman's rho: $0.97-0.91$) between Malaysian and American samples in terms of the order of magnitude to changes in life events (Woon, et al., 1971).

Statistical Analyses

The final data were analyzed using IBM Statistical Package for the Social Sciences Statistics (SPSS) Version 22. All categorical variables were described as frequency and percentage (%). Simple logistic regression (SLR) analysis was performed to determine the association between each independent variable with the risk of developing depression in elderly. The variables with p-value of <0.25 or clinically important were selected and further analyzed using multiple logistic regression (MLR) analysis.

RESULTS

A total of 422 respondents from various districts in Kelantan completed the questionnaires. The majority of them were from Malay ethnicity (97.2%) and majority of the respondents' age was between 60 to 75 years old (80.3%) with almost similar ratio between male and female respondents (male: n=219, 51.9%, female: n=203, 48.1%). Majority of the subjects were from Islamic religion (n=409, 96.9%), while Christian (n=1, 0.2%) and Buddha (n=12, 2.8%). 67% of them were married (n=282), while 1.4% (n=6) was single and 31.8% (n=134) were widow. Almost one third of the respondents does not receive formal education (n=140, 33.2%), while more than half of them received formal education, either primary (n=162, 38.4%), or secondary school (n=93, 14.9%) and 13.5% (n=57) completed their education up to college or university level. Majority of the subjects were from low level of income (n=258, 61.1%), and most of them received their monthly income from their children (n=239, 56.6%). Half of the respondents stay with their spouse (n=231, 54.7%), followed by staying with children (n=95, 22.5%). 57.3% of the subjects stay in traditional house (n=242). Most of the subjects are independent (n=408, 96.7%). Majority of them did not smoke or consume alcohol (not smoking: n=33, 79.9%, not taking alcohol: n=419, 99.3%). It was also found that majority of them did not perform exercise (n=276, 65.4%). Only minimal number of the subjects had history of mental illness (n=6, 1.4%), while for chronic illness, 36.5% (n=154) of the respondents had hypertension. From this study, it is shown that 68.5% of the respondents (n=289) was not aware of the facilities provided for the elderly, while only a minority of them joined 'Kelab Warga Emas' (n=34, 8.1%). The details of the

descriptive measures of the socio-demographic features are presented in Table 1.

This study found that the prevalence of depression among elderly in Kelantan is 22% (n=93). Of these, 31 of them are older elderly (aged more than 75), while majority of the respondents who are married were found to be not depressed (85.1%, n=240). Further findings are presented in Table 2.

Further analysis of associated factors for depression among elderly in Kelantan using simple logistic analysis is shown in Table 3. The simple logistic analysis found 11 independent variables that were significantly associated with elderly depression ($p < 0.25$), which are: older elders (aged >75), marital status, level of education, level of income, source of income, previous occupation, type of residency, house type, level of independency, lifestyle (exercise) and history of chronic illness.

Of these, multiple logistic regression analysis identified being older elderly and staying in traditional houses to be significant predisposing factors to develop depression, while marital status (being married) and performing exercises were determined to be the protective factors against depression (Table 4). Older elderly (age >75) has 2.11 times odds compared to younger elderly (age 60 to 75 years old) to have depression (95%CI: 1.17,3.79, $p=0.013$) when adjusted for other variables. People who live in traditional houses have 2.58 times higher odds compared to people live in bungalow or modern houses old to have depression (based on GDS) (95%CI: 1.37,4.86, $p=0.003$) when adjusted for other variables. Meanwhile, elderly who are married has 94.6% lower odds compared to those who are not married to have

depression (95%CI: 0.007,0.43,p=0.006) when adjusted for other variables. Respondents who perform exercise have 69% lower odds compared to people who did not perform exercise to have depression (based on GDS) (95%CI: 0.16,0.62,p=0.001) when adjusted for other variables.

Table 5 shows the results for simple logistic regression, which was done to determine the association between life events and depression in elderly. The simple logistic regression analysis found seven independent variables that were significantly associated ($p < 0.05$) with risk of developing depression. They are: death of spouse (95% CI:1.45, 26.34, $p=0.014$), serious illness (95% CI :1.15,7.84, $p=0.025$), changes of lifestyle (95% CI :1.32,4.61, $p=0.005$), changes of life habits (95% CI :1.50,4.73, $p=0.001$), changes of social activities (95% CI : 2.24,6.91, $p<0.001$), changes of sleeping habits (95% CI : 1.38,4.70, $p=0.003$), and changes of numbers of family get-together (95% CI : 1.32,4.07, $p=0.004$).

From the analysis, those who experienced death of spouse were found to be 6.17 times higher odds to develop depression (based on GDS-15)(95% CI =1.45, 26.34, $p=0.014$), followed by changes of social activities - with 3.93 odds (95%CI: 2.24,6.91, $p<0.001$). Meanwhile, elderly who had serious illness or injuries were three times more likely to get depressed (95% CI =1.15,7.84, $p=0.025$). Elderly who had changes of life habits in the past 12 months prior to the study has 2.66 times odds to have depression based on GDS-15 (95%CI: 1.50,4.73, $p=0.001$) while changes of sleeping habits indicates 2.54 times odd (95% CI: 1.38,4.70, $p=0.003$). Meanwhile, elderly who had changes of lifestyles has 2.47 times odd to have depression (95%CI: 1.32,4.61, $p=0.005$), and those with changes of numbers of family get-together have

2.31 times odd to develop depression (95% CI: 1.32,4.07,p=0.004).

DISCUSSION

Multiple studies in various parts of Malaysia have reported the prevalence of depression in elderly to range between 6.3% and 26% (Ibrahim et al., 2013, Mukhtar F., 2011). This study found a significant 22% of the elderly population to be suffering from depression, which is within the reported range. Life events have been identified to be a major contributory factor to depression, which were similarly reported by Kraaij et al. (2002) and Hardy et al. (2002).

Multivariate analysis identified multiple factors significantly associated with late life depressive disorders, which includes, among others, being older elderly (aged more than 75 years old). Blazer (2000) reported that depressive symptoms are more frequent in this age group, while Meller I et al (1996) reported that the one-year incidence of clinically significant depressive symptoms in those aged 85 years and above was 13%. The higher likelihood to develop depression is largely attributed to the limitation in mobility, various morbidities and cognitive impairment.

This study has also found an intriguing relationship between traditional housing architecture with depression. Disadvantaged living conditions would affect the elderly mental health. According to Marianne A. (2016), with increasing age, elderly prefer an easily accessible house in terms of its physical arrangement with

adequate basic necessities such as kitchen, bathroom, bedroom and living room. The modern houses in the study location were built on the ground and require less maintenance. The traditional house on the other hand, could be old and inherited from the previous generation, which requires more maintenance. This extra maintenance may become a burden to the elderly. This could predispose the elderly to develop depression.

The findings further support that marriage is a protective factor for depression, which is consistent with the often held beliefs and research reports (Kalycia et al, 2012, Yan XY et al, 2011, Soo Nang Jang et al, 2011). Marriage is a robust predictor of health outcomes as it provides support for daily care and mutual emotional support (Golden J. et al, 2009).

In addition, exercise was also found to render a degree of protection against depression. The inverse relationship between depression and physical activities have been described in many other studies (Adrian L.L. et al, 2013, Azevedo Da Silva et al., 2012) and can be explained by the euphoric effects that the latter bring about.

Meanwhile, with regard to life events that were associated with depression, this study determined that the death of a spouse highly contributed to the development of depression among elderly residents in Kelantan. Other contributory factors include life events and ongoing difficulties such as serious illness / injuries and changes of lifestyle. The determinants demonstrated in this study were in line with the findings of narrative reviews by Bruce (2002) and Cole & Dendukuri (2003).

With increasing age, one of the most common life events one has to face is

loss. Loss can be very painful especially when it involves loved ones such as a spouse. Although bereavement and depression are two different conditions, they are closely related to each other. When a bereaved person is unable to overcome his/her grief, the grief becomes prolonged and depression may ensue. During the first year of bereavement, 10–20% of surviving spouses develop symptoms of depression (Alexopoulos GS., 2004) which generally persist if left untreated. This condition could be more complicated with poor social support.

A study involving the Hochelaga-Maisonneuve family found that family and children networking sessions have positive impact to health (Zunzunegui et al, 2004). This explains the finding of positive relationship between the frequencies of family get-togethers with elderly depression. Similarly, Liu et al (2008) discovered that “Empty-nest status” was negatively related with life satisfaction. Migration of rural youths and young adults to cities, leaving their elderly parents behind as they seek for greener pastures, creates a huge gap in communication among family members. The painstakingly busy working schedules, accompanied with the millennial-must-have leisure activities have minimized the time left for these young urbanites to interact with their parents. Scarce parents-children interaction subjects the empty-nest elderly to loneliness, thus, predisposing them to depression.

Independence of the elderly, which influences the mental wellbeing is of great concern globally and is being addressed actively in many countries, including Malaysia (NICE, 2015). Serious illnesses or injuries were implicated to the deterioration in the level of functioning (both physically and psychologically), which invariably affects the ability to perform activities of daily living. This may explain the

finding by Alexopoulos (2004) which reported that elderly with greater overall medical burdens have higher risk to develop subsequent depression. In addition, it has also been hypothesized that medical illnesses, stress and major depression are reciprocally linked with each other (McEwan BS.,2003).

Another noteworthy finding from this study was the demonstration that changes in lifestyle, life habits and social activities were impactful to the elderly population, apart from being risk predictors for depression. These changes are quite inevitable in the elderly population because as individuals grow older, they have to go through innumerable psychological and social role changes. One of the common changes is retirement, whereby a person who is used to lead a busy working life may feel 'empty' in his or her life upon retirement. Failure to adjust to this phase may precipitate depressive episodes as well as changes to sleeping patterns. Some people who lacked quality sleep or had irregular sleeping pattern during their working lives may feel overwhelmed initially with the amount of time at hand that can be spent on sleeping. At a later stage, this 'extra time' if poorly utilized with meaningful activities, accompanied with changes in sleeping habits could contribute to the feeling of emptiness. On another note, changes of sleeping patterns can be a normal physiological response to ageing, along with the many other physical changes. As people age, they tend to have a harder time in falling asleep and have more trouble in staying asleep than when they were younger. This often leads to stress or worse, precipitates depression. In a recent meta-analysis, compared to people with no sleep problems, non-depressed people with insomnia were predicted to have a two-fold increased risk of developing depression (Baglioni C., et al., 2011).